

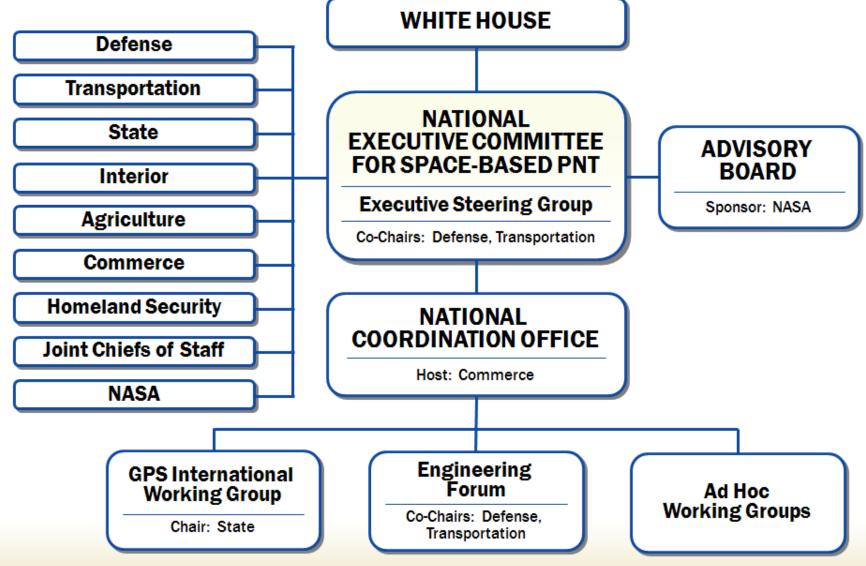
# LightSquared Broadband interference with GPS

Daniel Good National Geospatial Leader USDA – NRCS - NGMC



# U.S. Space-Based PNT Organizational Structure







# **USDA** representation

**EXCOM - Kathleen Merrigan, Deputy Secretary** 

ESG – Ann Mills, Deputy Under Secretary, NRE

ESG Working Group

Doug Lawrence, Deputy Chief, NRCS

Tommie Parham, Director, NRCS

Advisory Board Raj Khosla, Colorado State University Ronald Hatch, John Deere



# **USDA Agency POC**

**FS – Andy Trent** 

FSA - Shirley Hall

NRCS – Gary Hallbauer

**ARS – Charles Walthall** 

RMA – James Hipple

**OCIO – Norbert Snobeck** 



# LightSquared



- Formed by '04 Harbinger acquisition of SkyTerra Mobile satellite service (MSS) licensee in the 1525-1559 MHz/1626.5-1660.5 MHz band
  - Authorized in 2004 to operate ancillary terrestrial component (ATC) for dual-mode MSS/ATC devices
- Nov 18, 2010 Request submitted to FCC for modification of its ATC authority

  Lightsquared goal is to build out a nationwide 4G

ATC network (to cover 260M in U.S. by 2014)

Jan 26, 2011 – FCC Order & Authorization
Granted conditional waiver (ATC-only handsets)
Requires addressing GPS concerns

#### United States Department of Agriculture Natural Resources Conservation Service



THE WHITE HOUSE

Office of the Press Secretary

For Immediate Release

June 28, 2010

June 28, 2010

MEMORANDUM FOR THE HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES

SUBJECT: Unleashing the Wireless Broadband Revolution

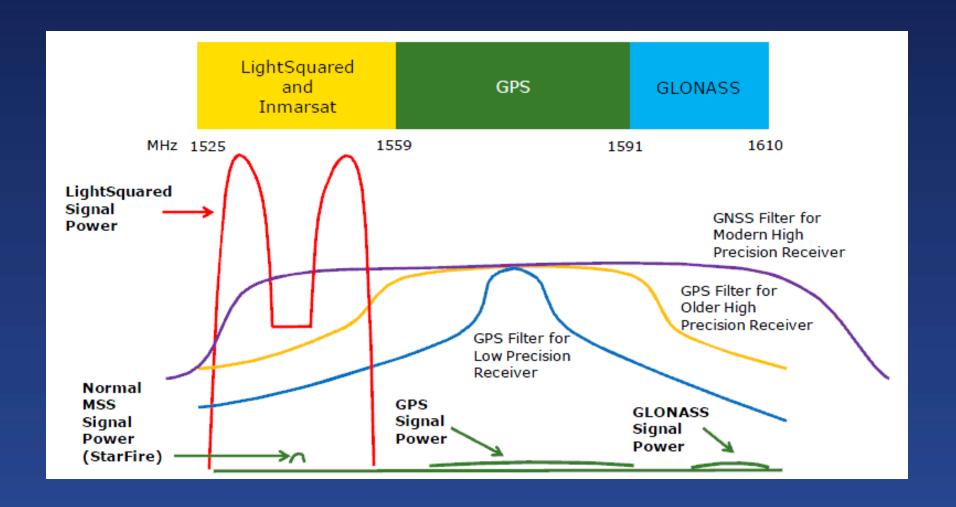
America's future competitiveness and global technology leadership depend, in part, upon the availability of additional spectrum. The world is going wireless, and we must not fall behind. The resurgence of American productivity growth that started in the 1990s largely reflects investments by American companies, the public sector, and citizens in the new communications technologies that are what we know today as the Internet. The Internet, as vital infrastructure, has become central to the daily economic life of almost every American by creating unprecedented opportunities for small businesses and individual entrepreneurs. We are now beginning the next transformation in information technology: the wireless broadband revolution.

Few technological developments hold as much potential to enhance America's economic competitiveness, create jobs, and improve the quality of our lives as wireless high-speed access to the Internet. Innovative new mobile technologies hold the promise for a virtuous cycle -- millions of consumers gain faster access to more services at less cost, spurring innovation, and then a new round of consumers benefit from new services. The wireless revolution has already begun with millions of Americans taking advantage of wireless access to the Internet.

Expanded wireless broadband access will trigger the creation of innovative new businesses, provide cost-effective connections in rural areas, increase productivity, improve public safety, and allow for the development of mobile telemedicine, telework,

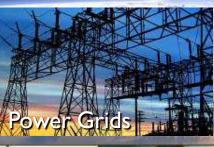
June 10, 2010 – **Directs the Executive Branch to work** with FCC towards making 500 MHz available for wireless broadband





#### **GNSS** is Essential to Our Economies





















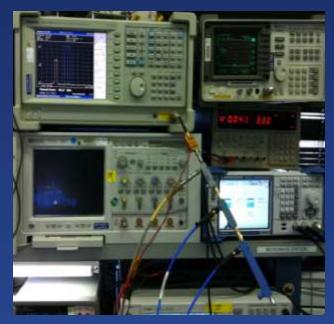


## **USDA** impacts

- Approximately \$60 million in assets, half are high precision equipment
- Safety of life (LEI, forest fire management)
- Aerial imagery acquisitions (NAIP, SAC, Resource)
- Estimated \$14 30 billion in GPS derived benefits annually from Precision Agriculture
  - decreased cost, increased yield, environmental benefit



### NPEF National PNT Engineering Forum







**Bench** 

**Anechoic Chamber** 

**Live Sky** 



## Testing initiatives

June 2011 testing – combined upper and lower bands

- -- bench, anechoic chamber, live sky testing
- revealed substantial interference

October 2011 testing – general navigation receivers and cellular devices

- -- bench and anechoic chamber testing
- -- lower band only Report will be released soon

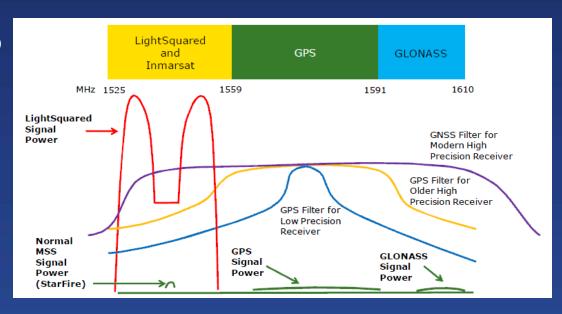
Possible 2012 testing – high precision receivers

- -- lower band only -- Test in planning phase
- -- should include testing of solutions (filters)



#### LightSquared changes initial plans to:

- Begin with "low 10" band transmissions with a temporary freeze on upper band use.
- Seek a filtering system for high precision receivers
- Work with MSS service providers to find alternatives.



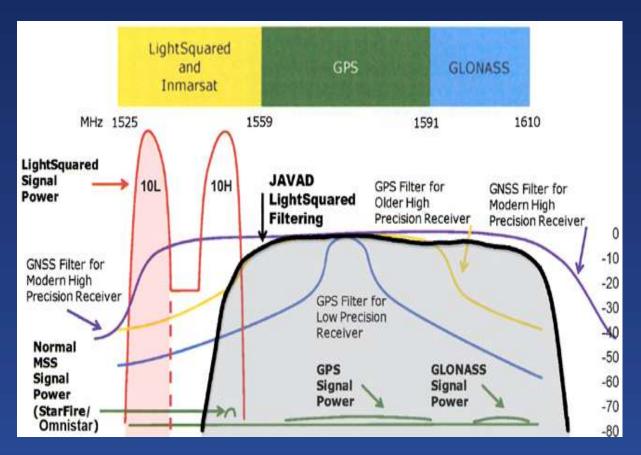


#### Precision Agriculture – GPS Correction Services and Required Accuracies

Differential Correction Services Available in Alabama for Agricultural  Production <sup>7</sup>				Position Accuracies Needed for Automatic Steering for Selected Field Operations <sup>8</sup>	
GPS Correction Service (Receiver must be compatible)	Provider	Pass-to-Pass Accuracy	Static Accuracy	Field Operation	Position Accuracy (2σ horizontal)
Wide Area Augmentation System	Federal Aviation	0.12:-	> 2.6		
(WAAS), 3-5 meter	Administration (FAA)	8-12 in	> 2 ft		
DGPS Beacon	U.S. Coast Guard (USCG)	3-6 ft	3-6 ft		
VBS, sub-meter	OmniSTAR	< 40 in	<40 in		
StarFire1 (SF1), 1 meter	John Deere	± 12 in	± 30 in		
				Fertilizer Application (bulk)	18 in (46 cm)
				Finish Tillage	18 in (46 cm)
				Spraying	18 in (46 cm)
XP, 20 cm	OmniSTAR	± 6 in	± 8 in		
StarFire 2 (SF2), 10 cm	John Deere	± 4 in	± 10 in		
HP, 10 cm	OmniSTAR	< 4 in	± 4 in		_
				Fertilizer Application (anhydrous)	12 in (30 cm)
				Heavy Tillage	12 in (30 cm)
				Planting	10 in (25 cm)
				Harvesting	10 in (25 cm)
				Stalk Chopping	10 in (25 cm)
Real-Time Kinematic (RTK), 1-3 cm	Various	< 1 in	< 1 in		
Continuously Operating Reference	National Geodetic	< 1 in	< 1 in		
Station (CORS)	Survey (NGS)				
Real-Time Networks	Various	< 1 in	< 1 in		
				Cultivating	2 in (5 cm)



# Javad develops filter





#### United Sta Natural R

#### Excuse me. You're in my space.

For years, GPS commercial device manufacturers have been squatting on LightSquared's spectrum.



#### They've ignored government standards for eight years.

To save a few cents, GPS commercial device manufacturers have made devices that receive signals not only in the GPS part of the spectrum, but also in ours. The Department of Defense, which runs the GPS network, has told GPS commercial device manufacturers that they can't expect full performance from receivers that are designed this way. Why did the GPS commercial device manufacturers ignore this?

#### They're taking advantage of an \$18 billion dollar subsidy.

GPS commercial device manufacturers benefit from an estimated \$18 billion taxpayer subsidy by offering a commercial service that is completely dependent on the government's satellite system.

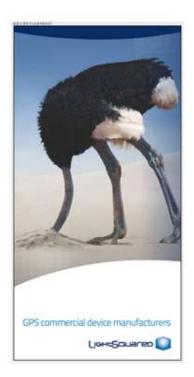
It's time to put GPS commercial device manufacturers in their place. And out of the way of the network that will bring broadband to all Americans.

Learn more at www.LightSquared.com/gpsfacts

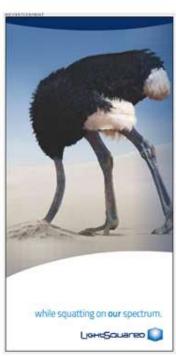


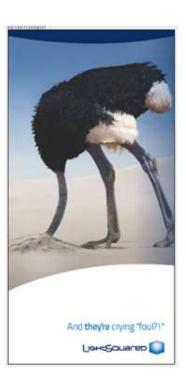


#### LightSquared ad on thehill.com 11 Sep 2011











#### United States Department of Agriculture Natural Resources Conservation Service



PATRICK J. LEAHY, VERMONT, CHAIRMAN

HERB KOHL, WISCONSIN
DIANNE FEINSTEIN, CALIFORNIA
CHARLES E. SCHUMER, NEW YORK
RICHARD J. DURBIN, ILLINOIS
SHELDON WHITEHOUSE, RHODE ISLAND
AMY KLOBUCHAR, MINNESOTA
AL FRANKEN, MINNESOTA
CHRISTOPHER A. COONS, DELAWARE
RICHARD BLUMENTHAL, CONNECTICUT

CHARLES E. GRASSLEY, IOWA
ORRIN G. HATCH, UTAH
JON KYL, ARIZONA
JEFF SESSIONS, ALABAMA
LINDSEY O. GRAHAM, SOUTH CAROLINA
JOHN CORNYN, TEXAS
MICHAEL S. LEE, UTAH
TOM COBURN, OKLAHOMA



COMMITTEE ON THE JUDICIARY WASHINGTON, DC 20510-6275

BRUCE A. COHEN, Chief Counsel and Staff Director KOLAN L. DAVIS, Republican Chief Counsel and Staff Director

September 29, 2011

Mr. Julius Genachowski Chairman Federal Communications Commission 445 12th Street, SW Washington, DC 20554

Dear Chairman Genachowski:

I am sure you will agree with me that both public funds and public assets should not be used for private benefit. Though private industry is the engine that drives our economy and entrepreneurship is a necessary ingredient in our economic recovery, government should not favor selected private companies. This means that if a private company seeks to benefit at the expense of the federal government, that company should, at the very least, compensate the federal government for its expense.

My concern regarding LightSquared's application to create a terrestrial 4G network is that the



# LightSquared Proposal

Limit the Power on the ground

Sites will be deployed to result in no more than:

- -30 dBm at points on the ground
- -27 dBm after January 1, 2015
- -24 dBm after January 1, 2017



## Questions?

